## (19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 1 September 2005 (01.09.2005)

**PCT** 

## (10) International Publication Number WO 2005/080368 A3

- (51) International Patent Classification<sup>7</sup>: C07D 311/68, A61K 31/353, A61P 9/06
- (21) International Application Number:

PCT/JP2005/003690

- (22) International Filing Date: 25 February 2005 (25.02.2005)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2004-048842

25 February 2004 (25.02.2004) JJ

- (71) Applicant (for all designated States except US): NISSAN CHEMICAL INDUSTRIES, LTD. [JP/JP]; 7-1, Kandanishiki-cho 3-chome, Chiyoda-ku, Tokyo 1010054 (JP).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): TSUKAGOSHI,
  Toru [JP/JP]; c/o Nissan Chemical Industries, Ltd.,
  Chemical Research Laboratories, 722-1, Tsuboi-cho,
  Funabashi-shi, Chiba 2748507 (JP). NAGATSUKA,
  Takayuki [JP/JP]; c/o Nissan Chemical Industries, Ltd.,
  Chemical Research Laboratories, 722-1, Tsuboi-cho,
  Funabashi-shi, Chiba 2748507 (JP). MATSUDA, Tomoyuki [JP/JP]; c/o Nissan Chemical Industries, Ltd.,
  Biological Research Laboratories, 1470, Oaza Shiraoka,
  Shiraoka-machi, Minamisaitama-gun, Saitama 3490294
  (JP). HASHIMOTO, Norio [JP/JP]; c/o Nissan Chemical
  Industries, Ltd., Biological Research Laboratories, 1470,
  Oaza Shiraoka, Shiraoka-machi, Minamisaitama-gun,
  Saitama 3490294 (JP).

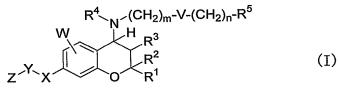
- (74) Agents: HANABUSA, Tsuneo et al.; c/o Hanabusa Patent Office, Shin-Ochanomizu Urban Trinity, 2, Kandasurugadai 3-chome, Chiyoda-ku, Tokyo 1010062 (JP).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

## Published:

- with international search report
- (88) Date of publication of the international search report: 10 November 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

## (54) Title: BENZOPYRAN COMPOUND USEFUL FOR THE TREATMENT OF ARRHYTMIA



(57) Abstract: This invention relates to benzopyran compounds of formula (I) wherein X is  $NR^6$ , Y is a bond, SO or  $SO_2$ , Z is  $C_{1-4}$ alkyl group or phenyl group, W is hydrogen atom, hydroxy group,  $C_{1-6}$  alkoxy group, a halogen atom,  $C_{1-4}$ alkyl group or  $C_{1-6}$ alkylsulfonylamino group,  $R^1$  and  $R^2$  are independently of each other  $C_{1-3}$ alkyl group,  $R^3$  is hydrogen atom, hydroxy group or methoxy group, M is an

integer of 0 to 4, n is an integer of 0 to 4, V is a single bond,  $CR^7R^8$ ,  $NR^9$ , O, S, SO or  $SO_2$ ,  $R^4$  is hydrogen atom or  $C_{1\text{-}6}$ alkyl group,  $R^5$  is hydrogen atom,  $C_{1\text{-}6}$ alkyl group,  $C_{3\text{-}8}$ cycloalkyl group,  $C_{3\text{-}8}$ cycloalkenyl group,  $C_{6\text{-}14}$ aryl group or  $C_{2\text{-}9}$ heteroaryl group. These compounds are useful as an anti-arrhythmic agent.



